

AMENDMENTS TO THE CLAIMS

1. (currently amended) A sorbent cartridge for use in preparing samples for chemical analysis, comprising:

a pipette tip having a longitudinal axis and a hollow distal tip with tapered walls defining an interior cavity extending along the axis and having an opening at a distal end of the tip which opening is not covered by a porous barrier;

a porous barrier in the tapered cavity placed at a predetermined location in the tip to define a sorbent volume between the barrier, the cavity walls and the opening at the distal end of the tip, the barrier allowing processing fluids to pass through the barrier; and

a sorbent material in the sorbent volume and extending from the opening toward the barrier, the sorbent material being selected for use in the chemical analysis and the porous barrier being selected to prevent passage of the sorbent material past the porous barrier and out of the sorbent volume, the sorbent material comprising a plurality of sorbent particles which can be separately expelled through the opening in the distal end of the tip during use of the cartridge.

2. (previously presented) The sorbent cartridge of Claim 1, further comprising a manually operated suction device on the pipette tip to exert a suction on the pipette tip to draw processing fluids through the opening in the tip, through the sorbent material and through the porous barrier.

3. (previously presented) The sorbent cartridge of Claim 1, wherein the pipette tip has a second opening opposite the opening in the distal end, and further comprising a setter configured to mate with the second opening to place a first cavity in the setter in fluid communication with the porous barrier, the setter having a plunger slidably received in a second cavity in the setter and placed in fluid communication with the first cavity, the plunger and second cavity sized relative to each other so as to create a suction sufficient to draw fluid from the opening in the tip into the cavity in the setter when the plunger slides in the second cavity.

4. (previously presented) The sorbent cartridge of Claim 1, wherein the sorbent material comprises a plurality of particles and the size of the opening in the tip is from about 2 to about 10 times the size of the particles used in the sorbent material.

5. (previously presented) The sorbent cartridge of Claim 1, wherein the sorbent material is placed in the cartridge by drawing a slurry of a solvent and the sorbent material through the opening

in the distal end of the tip, with the slurry solvent passing through the porous barrier to leave the sorbent in the sorbent volume.

6. (previously presented) The sorbent cartridge of Claim 1, wherein the sorbent material comprises a plurality of particles with a coating of a solvent on the particles that is sticky enough to cause the particles to stick together and resist passage out of the opening in the tip under gravitational forces while allowing sorbent to be expelled under pressure.

7. (previously presented) The sorbent cartridge of Claim 5, wherein the solvent is one of glycol, ethylene glycol or propylene.

8. (currently amended) A sorbent cartridge, comprising:

a pipette tip having an interior cavity in fluid communication with a distal opening located in the tip;

a filter placed in the tip and defining a predetermined volume that extends between the filter and the distal opening with no further filter being in the predetermined volume; and

a sorbent material substantially filling the volume, the filter retaining the sorbent material in the predetermined volume while allowing passage of processing fluids through the filter during use of the cartridge, the sorbent material comprising a plurality of separately movable particles during use of the cartridge.

9. (currently amended) The sorbent cartridge defined in Claim 8, wherein the pipette tip has a second opening adapted to removable receive a syringe setter to draw fluid from the distal opening, through the sorbent material and filter into the syringe setter.

10. (previously presented) The sorbent cartridge of Claim 8, wherein the predetermined volume is tapered toward the distal opening to form a frusto-conical shaped cavity and the filter comprises a frusto-conical filter.

11. (previously presented) The sorbent cartridge of Claim 8, wherein the sorbent material comprises particles having diameters and wherein the distal opening has a diameter of about 2 to about 10 times the maximum diameter of the sorbent material.

12. (previously presented) The sorbent cartridge of Claim 9, wherein the pipette tip contains a fluid drawn from the distal opening through the sorbent material and filter.

13. (previously presented) The sorbent cartridge of Claim 8, wherein the sorbent material comprises a plurality of particles having a coating of a solvent that is sticky enough to cause the

particles of the sorbent material to stick together and resist passage out of the opening in the tip under the influence of gravitational forces while allowing sorbent to be expelled under pressure.

14. (previously presented) The sorbent cartridge of Claim 13, wherein the solvent is one of glycol, ethylene glycol, or propylene.

15. (withdrawn) An apparatus for analysis of fluid samples for use in chemical analysis, comprising:

a hollow tip having an opening in a distal end;

means in the tip for retaining a porous barrier at a predetermined location to define a sorbent volume between the barrier and the opening in the hollow tip;

a sorbent material retained in the sorbent volume by the porous barrier, the barrier allowing passage of fluids but not the sorbent material, during use of the apparatus;

suction means in fluid communication with the hollow tip to suck fluid through the opening in the distal end and through the sorbent material and porous barrier.

16. (withdrawn) A method of forming a sorbent cartridge, comprising the steps of:

placing a porous barrier at a predetermined location in a hollow tip of a pipette to define a sorbent volume between the barrier and an opening in a distal end of the tip; and

sucking a slurry of sorbent into the sorbent volume through the opening in the distal end of the tip until the volume is filled with sorbent and sucking the solvent through the barrier while the barrier prevents passage of the sorbent, the solvent being selected so that it does not degrade later use of the sorbent for an intended chemical analysis.

17. (withdrawn) The method of Claim 16, comprising the further step of sucking a washing fluid through the opening, sorbent and barrier to remove undesired sample components from the sorbent.

18. (withdrawn) The method of Claim 16, comprising the further step of placing at least one cap on the pipette to help prevent degradation the performance of the sorbent.

19. (withdrawn) The method of Claim 16, comprising the further step of placing a syringe suction device in fluid communication with the tip to draw fluids through the opening, sorbent and barrier and into the syringe.

20. (withdrawn) The method of Claim 16, comprising the further step of placing a syringe in fluid communication with the tip to force fluids through the barrier, sorbent and opening.

21. (withdrawn) The method of Claim 16, wherein the solvent leaves a coating on the sorbent

that causes the sorbent material to stick together and resist passage out of the opening.

22. (withdrawn) The method of Claim 16, wherein the solvent is selected from the group comprising glycol and ethylene glycol.

23. (withdrawn) A sorbent cartridge formed by the method of Claim 16.

24. (withdrawn) A sorbent cartridge formed by the method of Claim 19.

25. (withdrawn) A sorbent cartridge formed by the method of Claim 21.

26. (withdrawn) A sorbent cartridge formed by the method of Claim 12.

27. (withdrawn) A method of forming and using a sorbent cartridge for chemical analysis, comprising the steps of:

placing a porous barrier at a predetermined location in a hollow tip of a pipette to define a sorbent volume between the barrier and an opening in a distal end of the tip;

sucking a slurry of sorbent into the sorbent volume through the opening in the distal end of the tip until the volume is filled with sorbent and sucking the solvent through the barrier while the barrier prevents passage of the sorbent, the solvent being selected so that it does not degrade later use of the sorbent for chemical analysis; and

sucking another fluid through the opening, sorbent and barrier to interact the other fluid with the sorbent and then withdraw the other fluid from the sorbent.

28. (withdrawn) The method of Claim 27, wherein the solvent is selected to leave a coating on the sorbent that causes the sorbent to stick together and resist passage out of the opening.

29. (withdrawn) The method of Claim 27, comprising the further step of drawing the other fluid into a removable container after it has interacted with the sorbent, and removing that other fluid from the removable container for further analysis or processing.

30. (withdrawn) The method of Claim 28, comprising the further step of drawing the other fluid into a removable container after it has interacted with the sorbent, and removing that other fluid from the removable container for further analysis or processing.

31. (withdrawn) The method of Claim 27, comprising the further step of applying a positive pressure through the barrier into the sorbent and out the opening to expel the sorbent for further analysis or processing.

32. (withdrawn) The method of Claim 28, wherein the removable container comprises a body of a syringe that was used to draw the other fluid through the opening, sorbent and barrier and into the

syringe.

33. (currently amended) A sorbent cartridge for use in preparing samples for chemical analysis, comprising:

a hollow tip having an opening in a distal end;

means in the tip for retaining a porous barrier at a predetermined location to define a sorbent volume between the barrier and the opening in the hollow tip, with no porous barrier being interposed between the opening and said means; and

a sorbent material between the opening and said means retained in the sorbent volume by the porous barrier for use in the chemical analysis, the barrier allowing passage of fluids but not the sorbent material, during use of the sorbent cartridge, the sorbent material including a plurality of sorbent particles that can pass in and out of the opening in the distal end during use of the cartridge.

34. (previously presented) The sorbent cartridge of Claim 33, further comprising suction means in fluid communication with the hollow tip to suck fluid through the opening in the distal end and through the sorbent material and porous barrier.

35. (previously presented) A sorbent cartridge for use in preparing samples for chemical analysis, comprising:

a tip having a longitudinal axis and a distal tip having cavity walls that define an interior cavity extending along the axis with an opening at a distal end of the tip;

a porous barrier in the cavity placed at a predetermined location in the tip to define a sorbent volume between the barrier, the cavity walls and the opening at the distal end of the tip, the barrier allowing processing fluids to pass through the barrier; and

a slurry of sorbent material in the sorbent volume and extending from the opening toward the barrier, the sorbent not being restrained by a porous barrier over the opening from being expelled from the opening, the sorbent material being selected for use in the chemical analysis and the barrier being selected to prevent passage of the sorbent material out of the sorbent volume, the sorbent material being adapted to pass into and out of the opening with the slurry.

36. (previously presented) The sorbent cartridge of Claim 35, wherein the cavity walls at the opening extend toward the longitudinal axis to form a lip that helps retain the sorbent in the cavity.

37. (previously presented) The sorbent cartridge of Claim 35, wherein the tip forms a tapered cavity ending at the distal end.
38. (previously presented) The sorbent cartridge of Claim 35, wherein the sorbent material substantially fills the sorbent volume.
39. (previously presented) The sorbent cartridge of Claim 35, wherein the sorbent comprises a plurality of particles coated with a material that helps prevent the sorbent from sliding out the opening.
40. (previously presented) The sorbent cartridge of Claim 39, wherein the particles are coated with propylene glycol.
41. (previously presented) The sorbent cartridge of Claim 39, wherein the particles are coated with ethylene glycol.
42. (previously presented) The sorbent cartridge of Claim 39, wherein the particles are coated with glycerol.
43. (previously presented) The sorbent cartridge of Claim 35, wherein the sorbent comprises a plurality of particles filling between about 50-60% of the sorbent volume.
44. (previously presented) The sorbent cartridge of Claim 35, further comprising a cap covering the opening and placed to prevent sorbent from passing out of the opening.
45. (previously presented) The sorbent cartridge of Claim 35, wherein the sorbent material comprises particles having diameters and wherein the distal opening has a diameter of about 2 to about 10 times the maximum diameter of the particles.
46. (previously presented) A sorbent cartridge for use in preparing samples for chemical analysis, comprising:

a tip having a longitudinal axis and a distal tip having cavity walls that define an interior cavity extending along the axis with an opening at a distal end of the tip;

a porous barrier at not more than one location inside the cavity in the tip and defining a sorbent volume between the porous barrier, the cavity walls and the opening at the distal end of the tip, the porous barrier allowing processing fluids to pass through the barrier; and

a slurry of sorbent material in the sorbent volume and extending from the opening toward the barrier, the sorbent material being selected for use in the chemical analysis and the barrier being selected to prevent passage of the sorbent material out of the sorbent

volume while allowing the passage of processing fluids through the porous barrier, the sorbent being sized to pass into and out of the opening with the slurry and the opening having no porous barrier restraining the sorbent from passing into or out of the sorbent volume through the opening.

47. (previously presented) The sorbent cartridge of Claim 46, wherein the tip is tapered toward the opening in the distal end of the tip.

48. (previously presented) The sorbent cartridge of Claim 47, wherein the sorbent material substantially fills all of the sorbent volume.

49. (previously presented) The sorbent cartridge of Claim 46, wherein the distal tip is conical.

50. (previously presented) The sorbent cartridge of Claim 46, wherein the distal tip is tapered at least immediately adjacent the opening in tip.

51. (previously presented) A sorbent cartridge for use in preparing samples for chemical analysis, comprising:

a tip having a longitudinal axis and a distal tip having cavity walls that define a tapered interior cavity extending along the axis with an opening at a distal end of the tip;

a porous barrier at not more than one location inside the cavity in the tip and defining a sorbent volume between the porous barrier, the cavity walls and the opening at the distal end of the tip, the porous barrier allowing processing fluids to pass through the barrier; and

a slurry of sorbent material in the sorbent volume and extending from the opening to the barrier, the sorbent material being selected for use in the chemical analysis and the barrier being selected to prevent passage of the sorbent material out of the sorbent volume while allowing the passage of processing fluids through the porous barrier, the sorbent being adapted to pass into and out of the opening with the slurry, the opening having no porous barrier restraining the sorbent from passing into or out of the sorbent volume through the opening.

52. (previously presented) A sorbent cartridge for use in preparing samples for chemical analysis, comprising:

a pipette tip having a longitudinal axis and a hollow distal tip with tapered walls defining an interior cavity extending along the axis and opening at a distal end of the tip which opening is not blocked by a porous barrier;

a porous barrier in the tapered cavity placed at a predetermined location in the tip to define a sorbent volume between the barrier, the cavity walls and the opening at the distal end of the tip, the barrier allowing processing fluids to pass through the barrier; and

a sorbent material in the sorbent volume, the sorbent material being selected for use in the chemical analysis and the barrier being selected to prevent passage of the sorbent material out of the sorbent volume, the sorbent material comprising a plurality of particles with a coating of a solvent on the particles that is sticky enough to cause the particles to stick together and resist passage out of the opening in the tip under the influence of gravitational forces while allowing sorbent to be expelled under pressure.

53. (previously presented) The sorbent cartridge of Claim 52, wherein the solvent is one of glycol, ethylene glycol, or propylene.

54. (previously amended) A sorbent cartridge, comprising:

a pipette tip having an interior cavity in fluid communication with a distal opening located in the tip, the opening not being blocked by a porous cover;

a filter placed in the tip and defining a predetermined volume between the barrier and the distal opening; and

a sorbent material substantially filling the volume, the filter retaining the sorbent material in the predetermined volume while allowing passage of processing fluids through the filter during use of the cartridge, the sorbent material comprising a plurality of particles having a coating of a solvent that is sticky enough to cause the particles of the sorbent material to stick together and resist passage out of the opening in the tip under the influence of gravitational forces while allowing sorbent to be expelled under pressure.

55. (previously amended) The sorbent cartridge of Claim 55, wherein the solvent is one of glycol, ethylene glycol, or propylene.

56. (previously amended) The sorbent cartridge of Claim 1, further comprising a removable cap covering the opening.

57. (previously amended) The sorbent cartridge of Claim 33, further comprising a removable cap covering the opening.

58. (previously amended) The sorbent cartridge of Claim 46, further comprising a removable cap covering the opening.

59. (previously amended) The sorbent cartridge of Claim 51, further comprising a removable cap covering the opening.
60. (previously amended) The sorbent cartridge of Claim 54, further comprising a removable cap covering the opening.
61. (new) The sorbent cartridge of Claim 5, wherein the solvent includes a form of glycol.
62. (new) The sorbent cartridge of Claim 13, wherein the solvent includes a form of glycol.
63. (new) The sorbent cartridge of Claim 53, wherein the solvent includes a form of glycol.
64. (new) The sorbent cartridge of Claim 55, wherein the solvent includes a form of glycol.
65. (new) A sorbent cartridge for use in preparing fluid samples for chemical analysis, comprising:

a pipette tip with a first opening and a first porous barrier placed in the tip to define a sorbent volume of about 1 μ ml or less between the porous barrier and the first opening, with no other porous barrier between the first porous barrier and the opening;

a plurality of sorbent particles in the sorbent volume coated with a solvent that wets the sorbent particles and can pass through the porous barrier during use of the pipette tip, the particles being loose enough to be expelled through the first opening after interacting with the fluid sample.

66. (new) The sorbent cartridge of Claim 65, wherein the solvent is sticky enough so the sorbent particles clump together and do not readily fall out of the first opening under the force of gravity but can be expelled through that opening under positive pressure.

67. (new) The sorbent cartridge of Claim 65, wherein the sorbent volume is filled by the sorbent particles.